AN AUTOMATED MATCHING ALGORITHM FOR MAGELLAN STEREO DATA

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The ability to extract topography from a pair of stereo images rests largely on the skill of the image matching algorithm to locate features common to both images. Although this is true for optical methods, it is particularly true for synthetic aperture radar (SAR) images which contain noise, distortion, and artifacts unique to the radar collection geometry. This paper describes a technique implemented to match stereo radar images of Venus collected by NASA's Magellan spacecraft. During two years of radar operation, Magellan collected stereo image data over 35% of the planet surface, emphasizing the need for a robust and highly optimized matching algorithm. Matching is done on the full resolution basic image data record (FBIDR) where the geometry and processing information is readily available. 'I'he algorithm uses a hierarchical approach based on a two dimensions] normalized correlation function to determine the image offsets. Matching is done on successively finer scales down to a final resolution of 4x4 image pixels. A technique to estimate the formal covariance error, and a way to uses these estimates to filter out bad matches, greatly reduces the effects of noise on the results.